Application Number;10/084,072
Group Art Unit Number;3635
Filing date;02/27/2002
Name of the examiner who prepared the most recent office action;
Mr. MCDERMOTT, KEVIN
Title of invention;
SUPPORT STRUCTURE FOR ISOLATIONG EARTHQUAKE MOTIONS

SPECIFICATION

remarks;

a) The amendments to the Specification was made by presenting replacement words and paragraphs marked up to show the immediate prior version.

The changes in amended specificaton were shown by strike through(for deleted matter) and underlining(for added matter).

b) The amendment to the specification was made so as to coincide with the changes to the drawing figures.

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Proposed AMENDMENTS to the SPECIFICATION

SUPPORT STURCTURE FOR ISOLATING EARTHQUAKE MOTIONS

BACKGROUND OF THE INVENTION;

The present invention has to do with a support structure for isolating earthquake motions, and more particularly, to prevent a chain bibrations of the structure from earthquake and/or wild storm such as hurrican etc.

Heretofore, conventional earthquake-proof constructions are based on methods to alleviate gearing of earthquake motions by intermediately connecting elastic materials such as springs, rubber, lead, and balancer etc. between said

foundation and bottom of structure.

Present invention is to provide another unique method to isolate linkage vibration of the earthquake and wild storm to ~~above~~ upper part of a structures taking advantages of friction-less nature ~~in point contact rolling~~ of a number of large and small steel balls rolling in point contact.

SUMMARY OF THE INVENTION;

The present invention ~~is designed~~ was made to put a constructions on a collective block of frictionless large and small steel balls.

Explaining my invention in more detail, the

device is designed to interpose large and small balls between pressure-receiving spherical curved steel plate and pressure-applying spherical curved steel plate ~~surfaces~~ as shown in annexed drawings (Fig. 2-A~Fig. 2-C), hence transmission of earthquake motions are isolated by above said rolling of two types of balls interposed between the two curved spherical surfaces as soon as earthquake occurs. This is the case just like the case of a ship on the water, in which we have no earthquake feeling since trembles are isolated by allowing the waving water to receive and transform them into rolling forces of the water wave.

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A prefered form of the present invention is illustrated in the accompanying drawings in which;

Fig. 1 is a plan view of the invention showing a ~~fundation~~ foundation hoop trembled from the east to the north direction.

Fig. 2-A is a sectional view of a composition of ~~fundamental~~ foundation hoop, a colum, and a foundation showing a frictionless slide of the invention.

Fig. 2-B is a sectional view of a main portion of the invention where the large and small balls arranged between two spherical steel plates.

tionless showing a frictionless slide part of

the invention.

Fig. 2-C is a enlarged sectional view of the same portion of the invention where large balls and small balls are shown in large scale.

Fig. 2-D is a sectional view of a foundation portion with a colum in image.

Fig. 3 is a imaginary view of a linkage movement of a foundation hoop when an earthquake occurs.

Fig. 4 is a perspective view of a sliding frame for sliding balls when earthquake motions were isolated.

Fig. 5 is a perspective view of the hoop of the invention.

Fig. 6 is a perspective view of the hoop of athe invention.

~~Fig. 7 is a perspective view of portion which closed for large balls and opened for small balls~~.

Fig. 8 is a sectional view of press working of a concave curved surface and a convex curved surface.

~~Fig. 9 is a partial perspective view of a holes.~~

~~Fig. 10 is a partial perspective view of a frictionless sliding concave portion~~.

Referential numerals in the drawings;

1--foundation hoop

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2--connecting bolts ~~of~~ for connecting a convex curved surface ~~and~~ with concave curved surface

3--pressure-receiving large steel balls (10.318mm9 in usual case)

4--rolling unifying small balls (8.73mm in usual case) in point contact

5--concave steel steel plate with pressure-receiving surface

6--convex steel plate with pressure-applying spherical surface

7--ball aligning frame

8--sodium silicate

9--colum

10--liquid replenishing pipe

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11--liquid sealing packing

12--polybinyl chloride ball cover

13--conclete covering all the surface of top and bottom steel plate

14--connecting steel frame for hoop tightening

15--connecting steel frame for hoop-tightening

16--iron and steel reinforced concrete block

17--bolts for pressing ball surface

18--pressing bolts and nuts

19--tightening portion for balls

20--concrete frame

21--pressing slot

22--iron frame for ball surface

23--foundation hoop(same as numeral 1)

24--hoop tightening frame

25--ball sliding block

DETAILED DESCRIPTION OF THE INVENTION:

According to my invention, large steel balls (3) and small steel balls (4) are interposed between pressure-receiving spherical curved steel plate 5 and pressure-applying steel plate (6) as shown in ~~the drawing 1~~ (Fig2-A~Fig. 2-C).

The peripheral scales of these plates are adjusted with that of a bottom of a structure such as a house or building to be built.

These plates are made of steel and used as a ball receiver.

The shape of said pressure-receiving plate (5) is recessed concave formed one and another pressure applying plate (6) is convex formed one.

These ~~oppositing~~ facing spherical plates are used as foundation of the building and also for the purpose of isolating earthquake mortions as described follows.

Pressure-receiving steel balls (3) and pressure-applying small balls (4) with (less accuracy) smaller diameter than that of pressure-receiving large balls are mounted to come in point contact in all direction.

The pressure-receiving concave curved surface (5) is supported by the pressure-receiving steel

balls(3) and as soon as earthquake okkures, the linkage of earthquake motions to the building is isolated by the rolling slide of said pressure-receiving steel balls(3).

As to the structure of the foundation, a concrete material covering all the surface of top and bottom steel plate with large balls and small balls interposed between them except curved surfaces of the top and bottom plates constitutes a colum(9) and the same apply to the foundation. The colum(9) including the pressure-applying convex-curved surface is jointed to the found-dation including pressure-receiving concave-curved surface by strain adjusting bolts and nuts.

When the pressure-receiving balls ~~(4)~~ (3) are rolled by the earthquake motions, small bolls ~~(3)~~ (4) interposed throughout the whole periphery of said large balls ~~(4)~~ (3) are rolled simultaneously, in which, as before described, the rinkage of earthquake motions to the structure or building is isolated by the rolling slide of the pressure-receiving large and small steel balls.

To cope with jump-up phenomenon caused by directly under earthquake or float-up phenomenon caused by typhoon etc., the hoop(1) is put on the foundation.

The hoop(1), without striving against linkage of earthquake motions, supports colum(9) together

with the foundation.

Because the steel balls(4) moves to the side of higher foundation pressure-receiving curved surface when the building moves due to hurricane, building mounted on the foundation hoop(1) leans toward the wind pressure direction and increases resistance.

In addition, in order to completely achieve functions of this device, materials with properties of sodium silicate(8), etc., are filled with their properties of rust prevention, anti-freezing, and lubricant maintained are filled and functions of isolating earthquake are held semi-permanently.

The pressure applying and receiving steel plates

are HRC50 and are free of dent when tested for withstanding pressure at 1 ton using pressure-receiving steel balls.

Concrete with strengh of KGICM/700 are used.

When this invention apply to the colum with cross section of 80cm 80cm, the pressure-receiving force of 3200 ton is obtained.

STRUCTURING PROCESS OF THE INVENTION;

1. viscous materials with properties of rust prevention is spread and coated onto the plane steel plate on spherical curved iron and steel flame adjusted so as to fit to a projected structer.

2. fit the hole cast in a projecting pole of

position frame.

3. Insert all small balls(4) into above said holes closing the the holes for balls(3).

4, Pulling up the holes cast horozontally(Fig. 9), then, fit a regular holes onto projecting pole.

5. All large balls(3) are casted in free movement.

6, Suffice the NA2S108 to concrete mortar partition plate by supply pipe, then steel plate and block composed iron and steel frame are piled on them.

7, Concaved and convexed slide blocks are put on press ditch(Fig. 7) and press it by short-term clamp bolt-nut by which concaved and convexed

spherical surface are made.

8, Construct a provisional concrete frame, then put concrete into above structured frame.

9, When applying weight reached to exceeding level of steel plate rpulsion, provisional frame is solved.

10, Fundamental hoop(i) is connected to combined hoop, tightening frame by scale of 1/4 (Fig. 6). By this proceeding the hoop aligns with earth-quake motion and wind pressure succesfully.